Two Prime

A DERIVATIVES TRADER'S GUIDE TO **INSTITUTIONAL CRYPTO AND DEFI**

By

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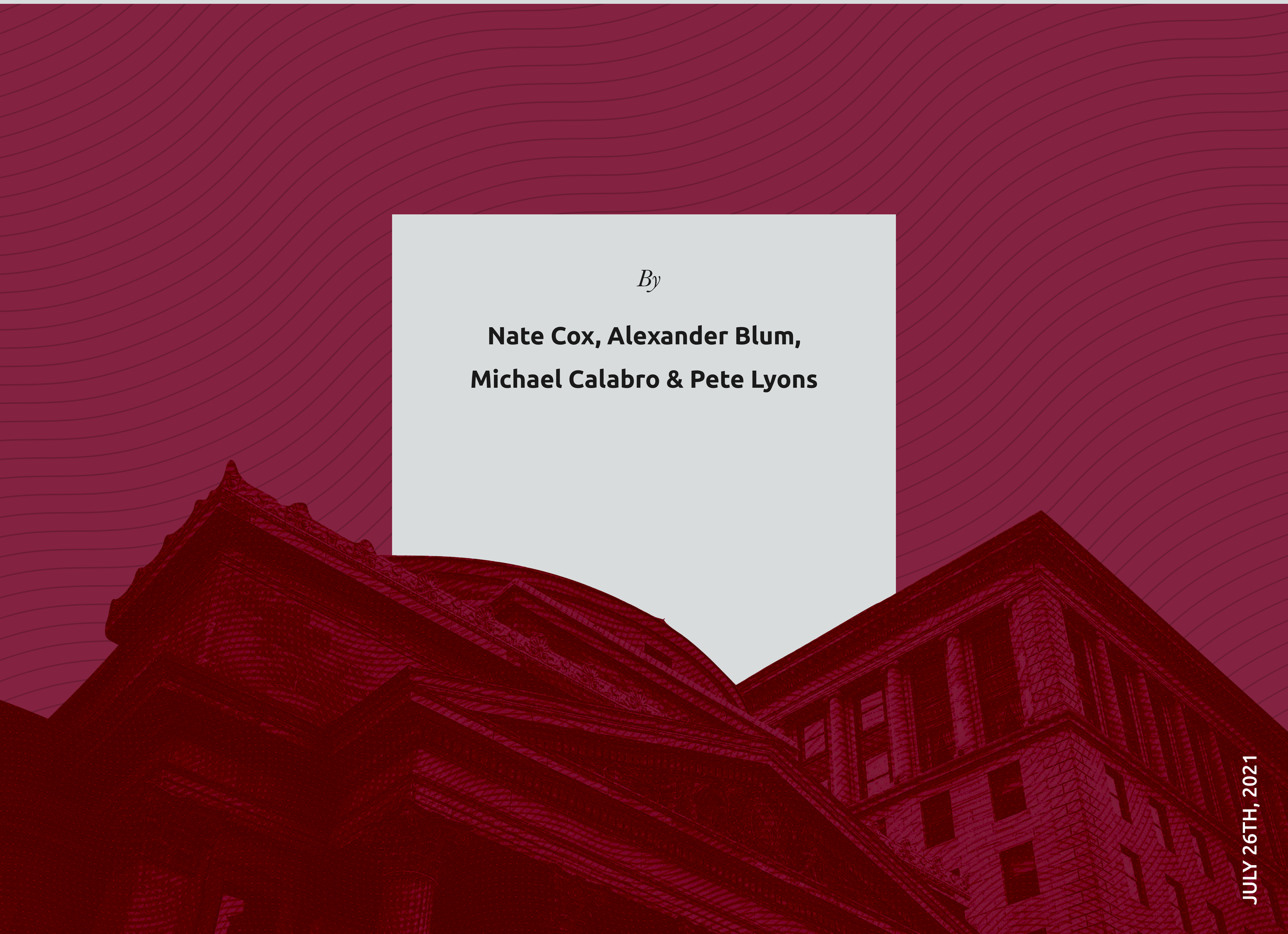
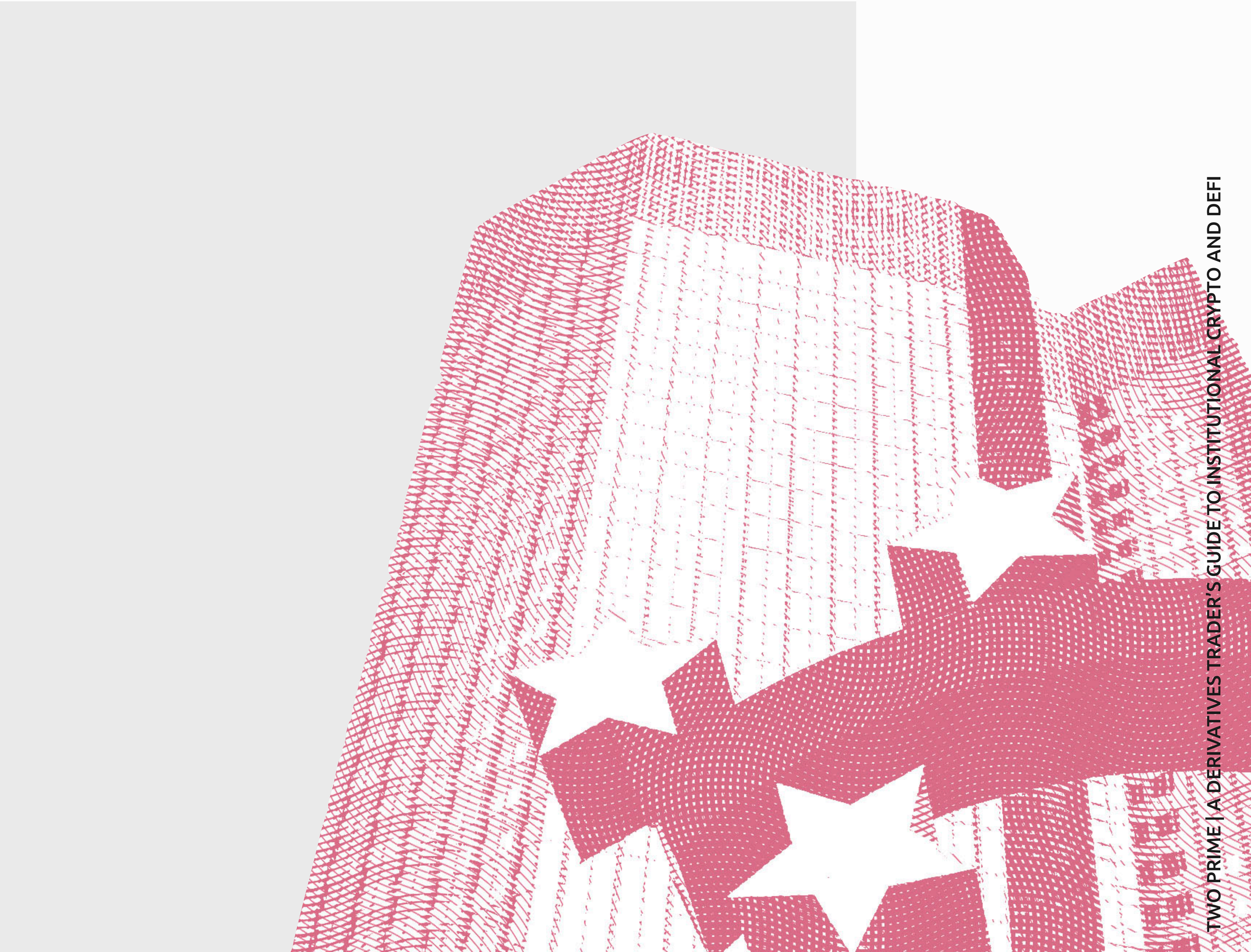


JULY 26TH, 2021

INTRODUCTION

Digital Assets markets continue to mature in size, complexity, and institutional adoption. As such, the market has seen substantial growth in futures, options, and more exotic derivatives in 2020 and 2021. Particularly for Bitcoin and Ether, derivative traders have a full suite of strategies and products available to them with significant volume. For those looking to generate alpha, the current market environment offers substantial opportunity for savvy derivative traders to harness volatility and manage risk.

The following report will take an in-depth look at digital assets derivatives and DeFi markets, provide some basic information about the products available in those markets, and review strategies that portfolio managers, traders, and investors can deploy to take advantage of the growing derivative markets for digital assets.



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VOLATILITY & DERIVATIVES

Derivatives have been a longstanding feature of traditional finance markets, providing unique opportunities for price discovery, improved market efficiency, and risk management through futures and options. Derivative metrics analyze these futures and options markets surrounding the underlying assets and provide context to market outlook as a whole. The explosive growth of digital assets has led to the creation and maturation of several derivative markets, the most robust being built around Bitcoin and Ether. However, altcoins have also started to see futures markets and OTC option markets develop as exchanges look for ways to provide investors with tools to manage risk and capture yield.

For Bitcoin and Ether, sophisticated analytics on these derivative markets can provide insight into the expectations for future price movements and how to position portfolios for risk management and alpha generation.

Options

Options are derivative contracts that give the contract buyer the right to buy or sell an underlying asset at a certain price at a predetermined time in the future in exchange for a premium up front. When the buyer of an option purchases a “call” they are buying the right to buy an underlying asset in the future at a specific price, while if they purchase a “put” option they are buying the right to sell an underlying asset to their counterparty at a specific price. Someone who sells an option is selling the right to buy or sell an underlying asset at a specific price and at a predetermined time in the future.

Exchange-traded options have predetermined, regularly-spaced prices, known as strike prices, and contract expiration dates. Contract periods longer than a week always expire on the last Friday of every month, while weekly options expire Friday each week. The number of expiration dates and strikes will vary based on a particular exchange's liquidity (or the amount of capital changing hands).

Deribit, which hosts about 90% of the digital assets options volume for Bitcoin and Ether, has weekly options expirations for one month out, monthly expirations for one quarter out, and quarterly expirations one year out. Strike prices are less regular than expiration dates but always cluster around the spot price of the underlying asset. New strike prices will be added to the exchange if the price of the underlying asset changes significantly or if there is sufficient customer demand for a particular strike.

Quick Review of Options Greeks

Options Greeks refer to the set of factors that affect option pricing, denoted by the "greeks" - or the letters that refer to each factor. The four main measures are Delta, Theta, Gamma, and Vega:

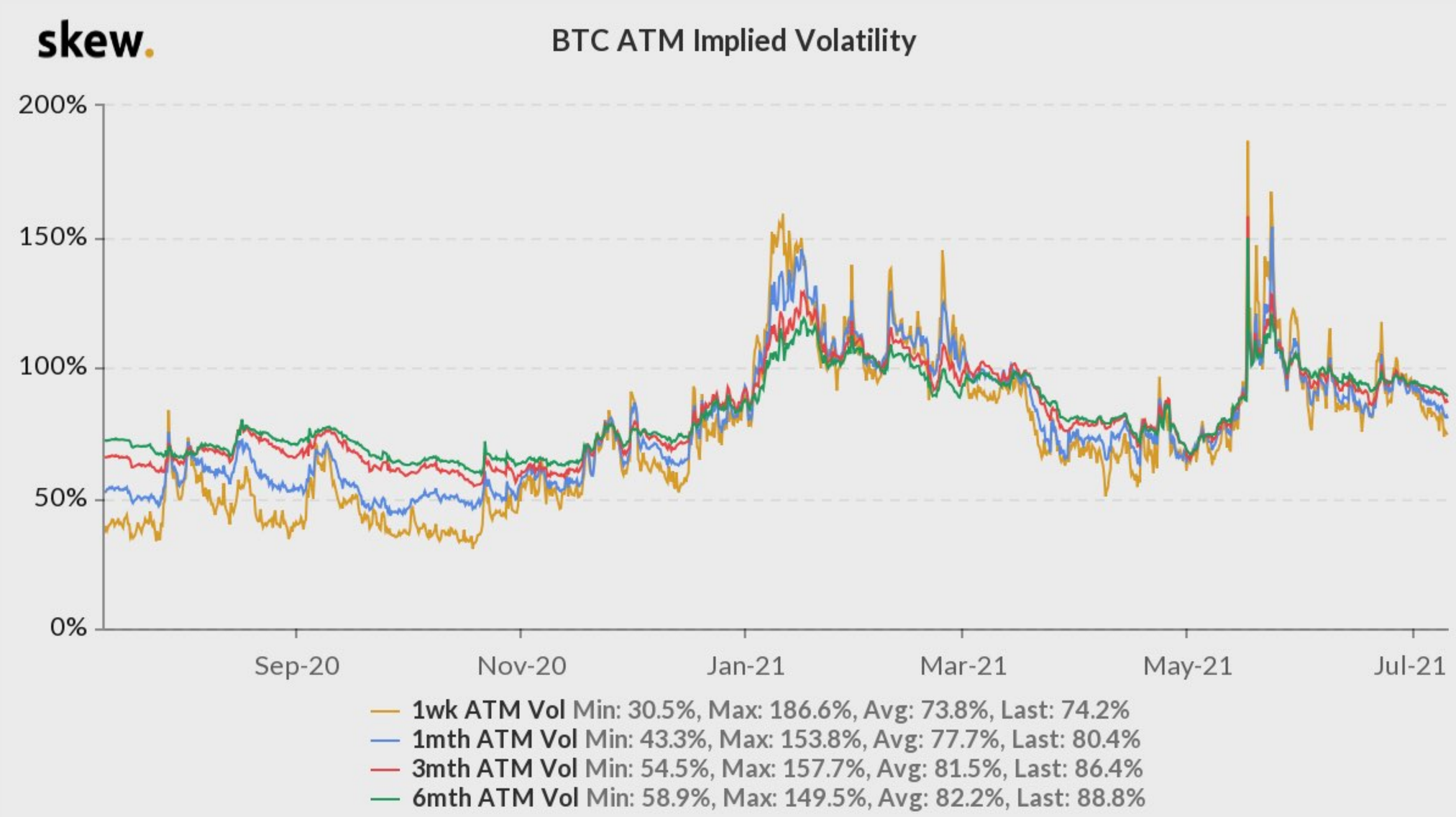
Δ Delta	Rate of change of the option vs. change in spot	Directional correlation of the portfolio with the underlying
Θ Theta	Time premium associated with an option	Theta decays over time when spot price remains constant
Γ Gamma	The rate of change in an option's delta per 1-point move in the underlying asset's price	Adjusting gamma changes how sensitive a portfolio moves in relation to spot
V Vega	The change in the option's price for a one-point change in implied volatility	Strategic approach to long/short volatility can increase odds of profitable derivative trading

Options Metrics and Volatility

Implied Volatility

Implied volatility (IV) measures the likelihood of changes to an underlying asset's price, and directly affects the pricing of options contracts. High implied volatility is indicative of turbulent and unpredictable market conditions. Generally speaking, when implied volatility is high, option sellers can take advantage of the inflated option pricing by "selling volatility" and capturing high probability alpha as prices normalize and volatility reverts lower. It is worth noting, this type of trading comes with significant risk as prices are unpredictable and short strikes can be tested if prices continue to move in one direction.

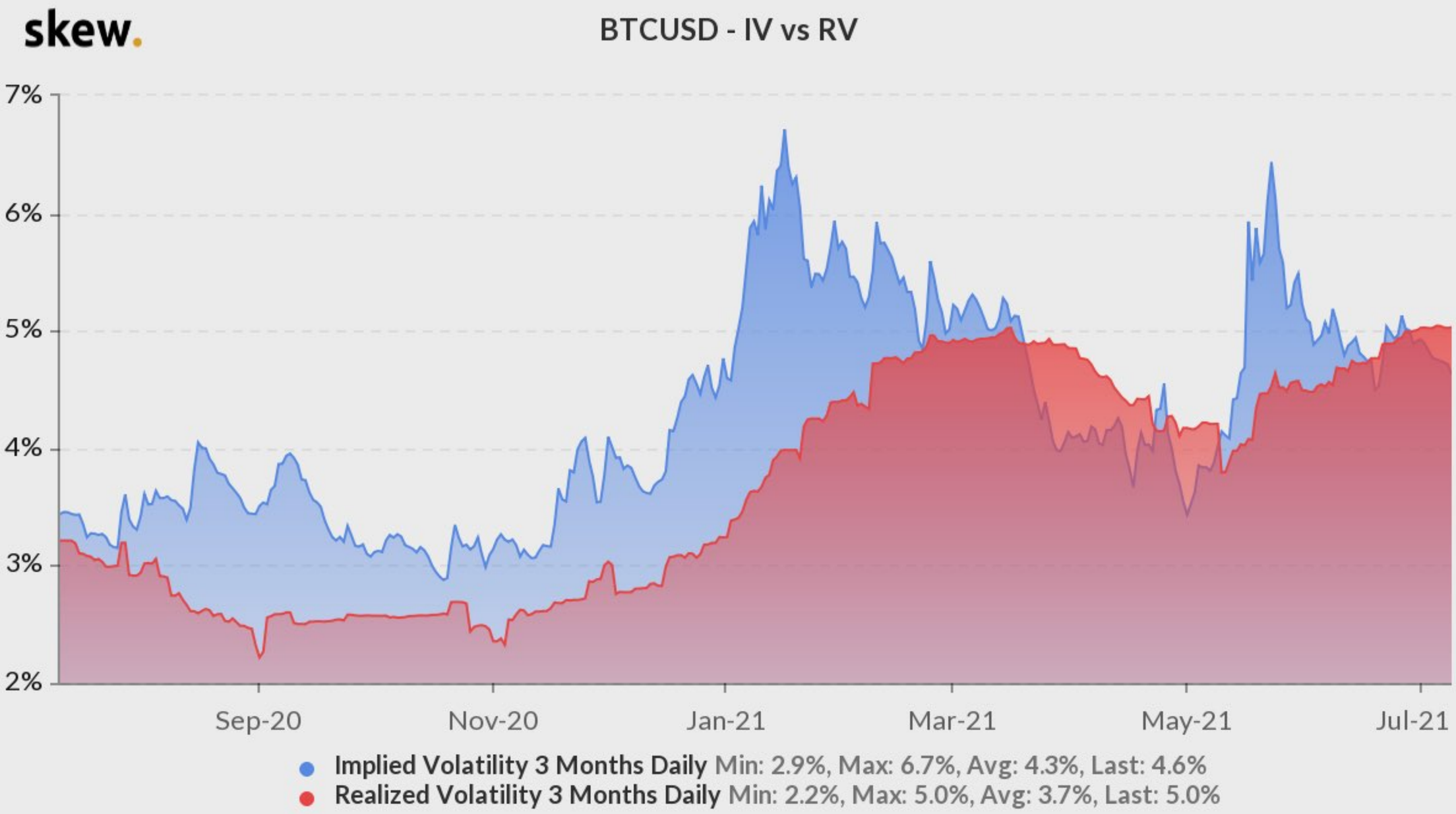
Conversely, low implied volatility usually signals a level of complacency or "certainty" in markets and can support trend following strategies. It also provides investors and hedge fund managers with the opportunity to purchase "cheap" protective positions should they need to hedge a position.



Bitcoin implied standard deviation over a 1 week, 1 month, 3 month, and 6 month rolling basis

Realized Volatility

Realized volatility (RV) is the standard deviation of the market move, usually measured over a trailing time series (30 days, 7 days). Realized volatility differs from implied volatility in that implied volatility is based on the future expected price moves, derived from the pricing of options contracts, while realized volatility is derived from the realized price action of the underlying asset.



3 month Realized and Implied Volatility are the 3 month standard deviation and implied standard deviation of Bitcoin

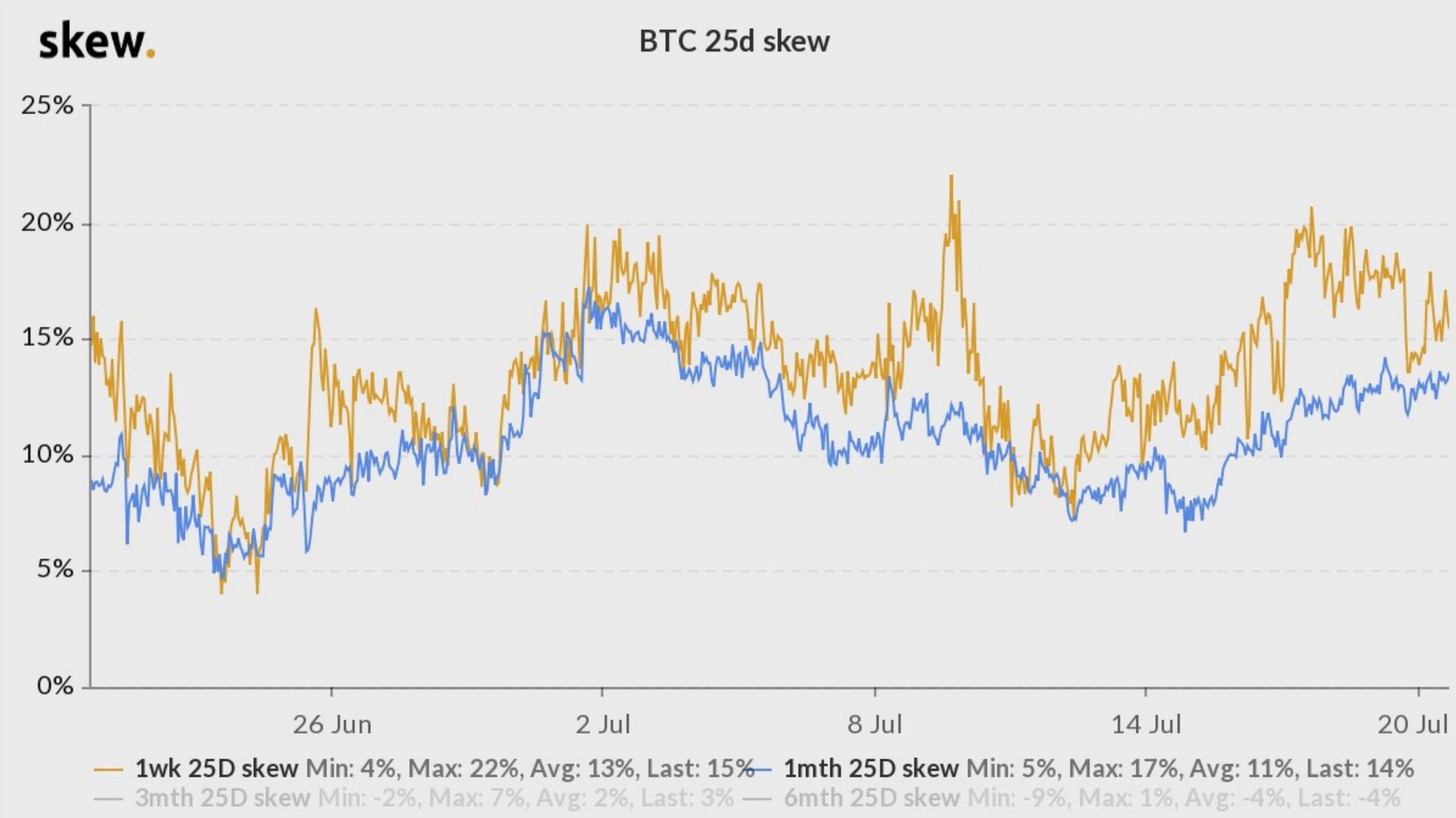
Realized/Implied Volatility Divergence

The divergence between implied volatility and realized volatility, coupled with other metrics, can help gauge market sentiment and directional propensity. It is generally the case that implied volatility is higher than realized volatility, as the expectation of volatility commands a premium in option markets for the uncertainty surrounding future price moves. When the divergence between realized volatility and implied volatility reaches statistically significant divergent levels, this can portend a change in the volatility regime, as volatility, in general, tends to oscillate within a range. Just as spot prices do not always go up, volatility does not always remain low, and this oscillation is precisely what allows derivative traders to generate alpha.

Skew

Skew[1] is a measurement of the directional bias of the derivative prices. When options traders are willing to pay more for downside strikes (puts) than upside strikes (calls) there is said to be a bearish skew in markets. Investors can use these metrics to anticipate future price movements, or to take contrarian positions, betting against skew and selling "overpriced" option premia.

1. Not to be confused with the data aggregation site Skew.com

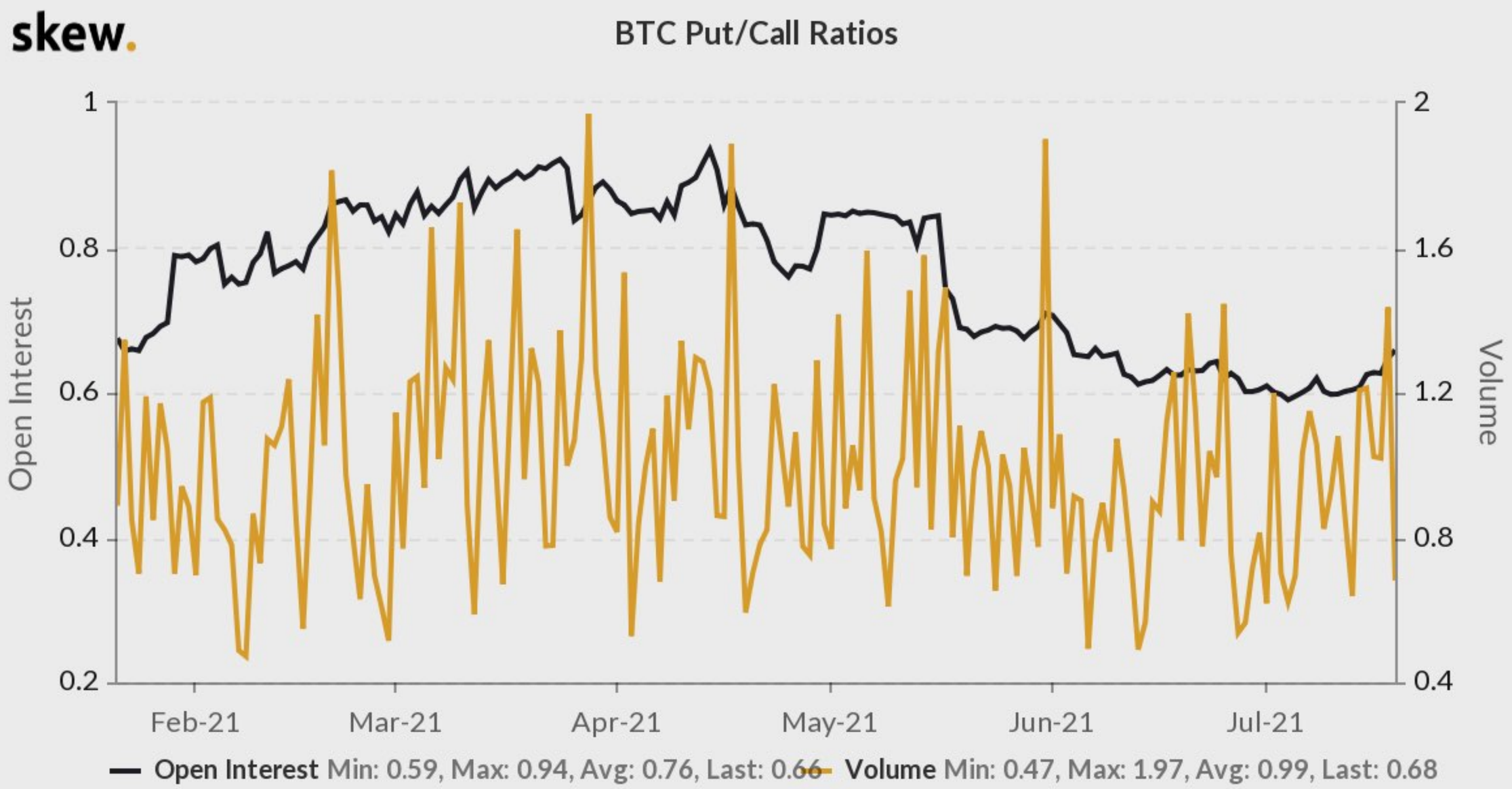


Bitcoin skew averaged over a rolling 1 week and 1 month period, respectively; skew above 0 represents the degree to which puts are priced higher than calls, indicating a bearish market out look for the respective time frame.

Trading around Skew typically involves trading a spread in which the long option is closer to the money, with lower implied volatility, and the short option is traded further out of the money where higher implied volatility exists. The goal is to capture the spread in volatility as skew normalizes and closes the volatility gap. Non-standard ratio spreads are a good way to trade around skewness and capitalize on the ebb and flow of volatility.

Put / Call ratio

Put / Call ratio is the measure of puts to calls being purchased on a specific asset and indicates how bullish or bearish traders are positioning for a future move. When the value exceeds 1, it indicates that more puts are being purchased, and traders are expecting a move lower. Conversely, a reading below 1 would indicate that traders are net bullish on the future price, and are purchasing more calls and will profit into a move higher.



In the Put/Call Ratio chart above, we can see the ebb and flow of **Open Interest** (the net sum of positions for Puts and Calls in the market) as well as the daily trade **volume** for puts and calls that affect the total open interest.

Monitoring this ratio provides some insight into the **overall sentiment of option market participants, and although it may not always provide actionable trade execution, it can provide instruction on how to manage a larger portfolio, and longer duration option positions.**

As the Put/Call ratio enters statistically high and low ranges, ranked across previous cycles, these open interest levels may serve as warning flags that conditions could fluctuate, oscillating between stability and volatility.

Trading Volatility

By combining data from the derivatives markets, portfolio managers can take advantage of market structure and better position protective positions or speculative long positions to simultaneously reduce costs (premium paid) and anticipate volatility.

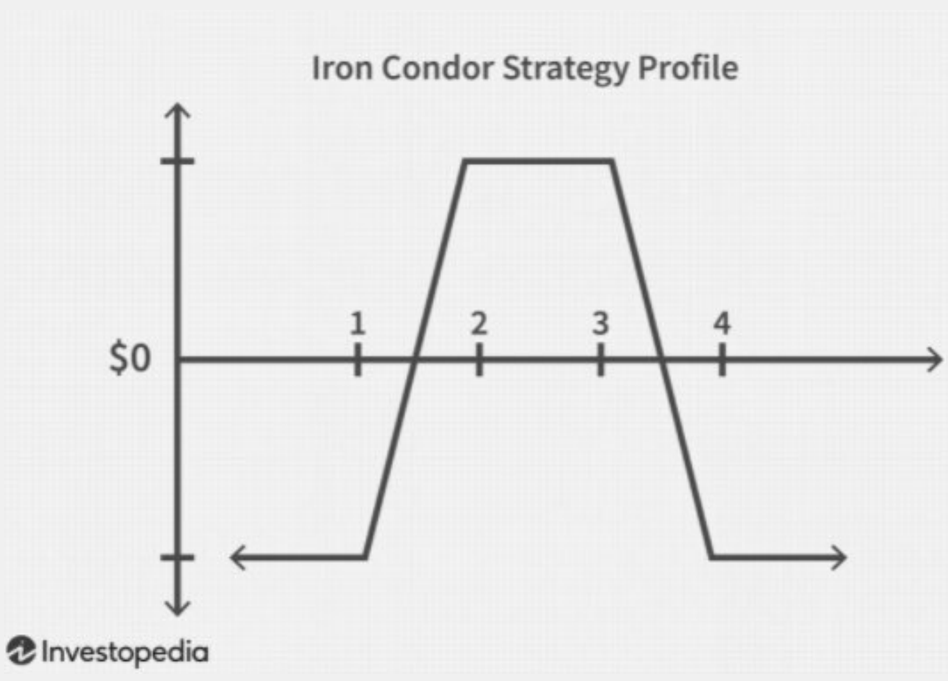
While any single indicator is likely inadequate to make definitive adjustments to the portfolio, using the above-mentioned derivative metrics like Implied Volatility, Skew, and Put/Call Ratios together provide a more holistic approach to building both long and short volatility portfolios.

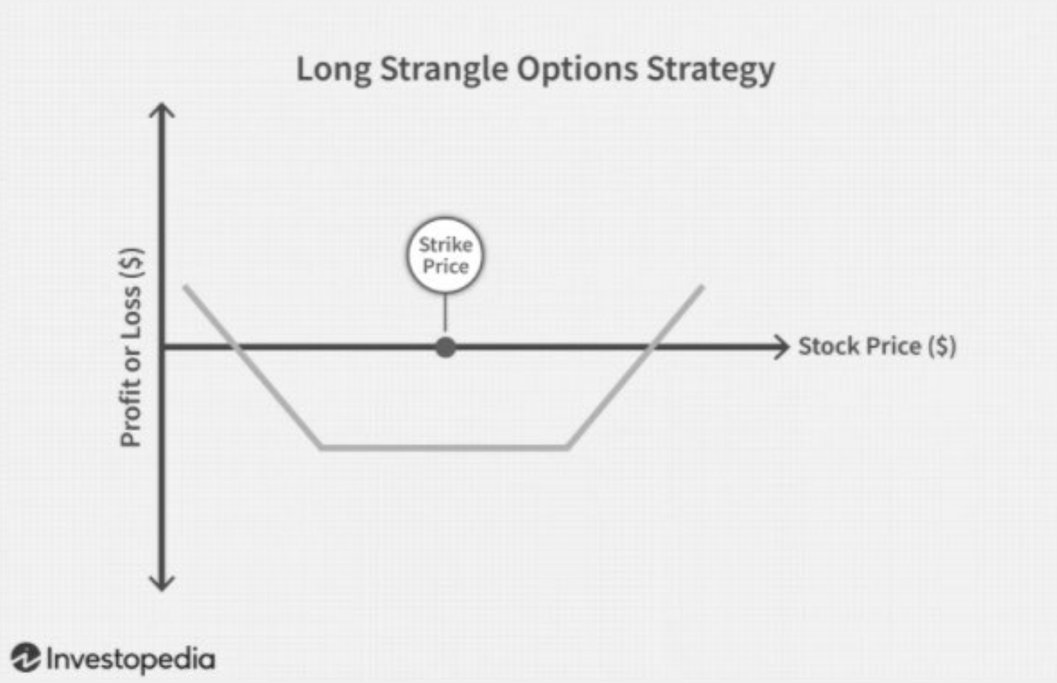
Long and Short Volatility Positions

Consider markets in the midst of a statistically "low volatility" environment relative to previous volatility cycles. **During low volatility environments, it is not statistically beneficial to maintain short volatility positions as the risk/reward is dangerous (classic "picking up pennies in front of the steam roller" scenario).** Volatility premiums are essentially too low to make it worth the risk to be a net seller.

Low volatility environments are generally better managed using **options spreads**, to offset volatility exposure, and express delta. Short delta (expected move down) in a low volatility environment can be expressed by a long Put Spread (PS), naked Put, or short Call Spread (CS), all of which are preferable to outright selling (naked) calls.

If markets are extremely low vol, and option premiums become statistically inexpensive, long volatility strategies like a long single-leg position: **Call, Put**, or long combos **like Strangles** (long call + long put) or long **Iron Condor** positions (long CS + long PS), are ways to capture the future price volatility if and when it returns. Long option positions in a low volatility environment will benefit from directional moves (delta) as well as expansion in vega and gamma.





For both speculative (long delta) and protective (short delta) positions, the intelligent derivatives manager must find the most inexpensive way to achieve the highest possible risk/reward profile for the portfolio.

While low volatility environments lend themselves to buying premium and being a net purchaser of options, high volatility environments support the exact opposite derivatives portfolio, where a manager is incentivized to become a net premium seller.

Hedge Positions vs. Speculative Positions

It should be noted that the responsibility of the hedge positions to offset core portfolio delta (long spot or futures) is generally non-negotiable. While the delta ratio of a derivative portfolio vs. spot (how short the hedge is vs. the net long delta of the core portfolio) can vary within a range of targeted short deltas**, the deltas of the hedge vs. core portfolio should always remain inversely correlated**, or protective into tail events. It is generally the mandate of the hedge fund portfolio manager to remain hedged at all times.

Speculative positions, on the other hand, can have more dynamism as far as the total holding time, profit targets, and delta expression.

There are a variety of use cases for building derivative positions, but for this report, we will focus on risk management (hedging / short) and speculative (long) derivative positions.

Low Volatility Market Conditions & Portfolio Construct

The above market conditions showing tightening price ranges and reduced volatility lend themselves to long premium positions as option prices compress.

Low Volatility Market Conditions & Portfolio Construct

To take advantage of a lower volatility environment, consider the following (July) Put Spreads
Expiration: July 30 @ 18 DTE (days to expiration)

Long $32k x $30k Put Spread 1x1
R/R: $600 Max Risk vs. $1400 Max Reward = 233%

Strike	Pos	Last	Size	IV	Bid	Mark	Ask	IV
30000		0.0290	11.1	82.0%	0.0270 $914.29	0.0281 83.53 %	0.0285 $965.08	84.1%
32000		0.0450	22.8	78.2%	0.0445 $1507.41	0.0451 78.97 %	0.0455 $1541.28	79.4%

Long $30k x $28k Put Spread 1x1 =
R/R: $424 max Risk vs. $1576 Max Reward = 371%

Strike	Pos	Last	Size	IV	Bid	Mark	Ask	IV
28000		0.0190	9.2	88.2%	0.0165 $558.81	0.0172 89.61 %	0.0180 $609.61	91.0%
30000		0.0290	0.5	83.5%	0.0280 $948.29	0.0281 83.53 %	0.0290 $982.15	84.9%

Long $28k x $26k Put Spread 1x1 =
R/R: $271 max Risk vs. $1729 Max Reward = 638%

Strike	Pos	Last	Size	IV	Bid	Mark	Ask	IV
26000		0.0120	9.1	95.2%	0.0100 $338.70	0.0105 96.62 %	0.0110 $372.57	97.8%
28000		0.0190	38.9	88.2%	0.0165 $558.84	0.0172 89.61 %	0.0180 $609.65	91.0%

As strike prices move farther from spot price, so does the net debit (cost) of each spread, and the total risk/reward profile moves inversely, creating a better overall payout, but creates a lower probability of profit (PoP).

Looking further out in Duration: August 27 Option Chain - 46 DTE
Long August $30k x $25k Put Spread 1x1
R/R = $1358 Max Risk vs. $3642 Max Reward = 268%

Strike	Last	Size	IV	Bid	Mark	Ask	IV
25000	0.0265	23.7	91.4%	0.0260 $883.62	0.0263 91.79 %	0.0265 $900.61	92.0%
30000	0.0635	51.2	83.3%	0.0625 $2123.90	0.0636 84.21 %	0.0645 $2191.87	85.0%

This spread takes advantage of a low volatility environment and provides asymmetric downside risk mitigation. Depending on the desired trade duration and cost per spread, a derivative manager can target exactly how short to get (delta), how long duration (DTE), and the total acceptable risk profile for the portfolio.

In addition to these simple spread strategies, consider that legging into a complete derivative portfolio can provide opportunities to achieve a higher probability of profit (PoP), reduce spread costs, or increase premium credits.

Changing Volatility Regimes & Legging Into Strategies

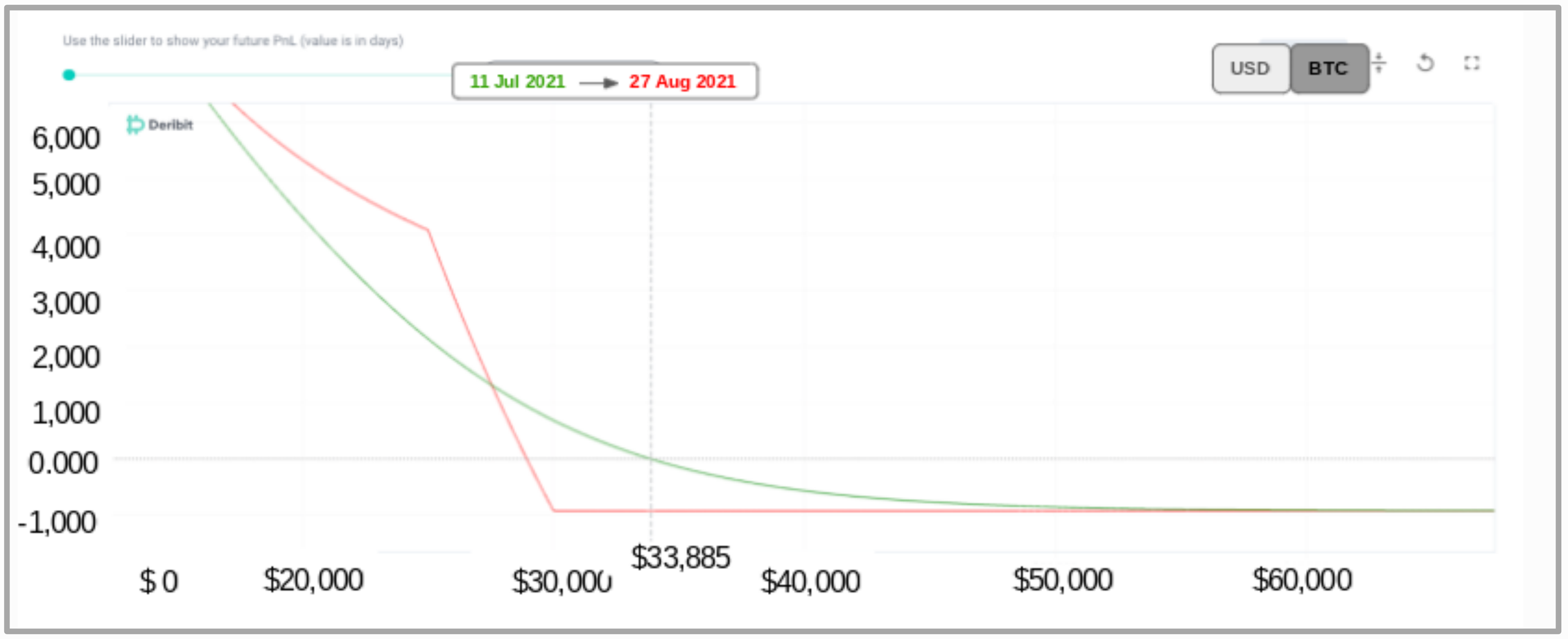
When volatility moves from Low to High, existing positions that are long volatility benefit from rising vega and gamma and will become profitable. At this point proper management of positions is critical. Consider the long August Put Spread examples above with short Delta.

As underlying spot price moves lower, the opportunity to "leg into" the remainder of a position, or generate a new derivative construct allows profit capture and delta adjustments.

Long Put Spread management: Low Vol to High Vol

1. Sell-to-close open Put Spread (PS) for a profit (eliminates any further protective hedge value - not advised)
2. Roll down PS (reduces total short delta but retains protective hedge quality)
3. Sell NEW PS BELOW current long spread: creates a Put Butterfly (or Put Condor)
4. Leg into a Ratio Spread 1x2 - (creates naked short position - high PoP but reduced hedge value, may violate portfolio mandate)

Original Position:
Position: Long August $30k x $25k Put Spread (Debit Spread)
Position Size: 25x @ 0.033 Debit = ~1 BTC
Max Profit = 2.68 BTC



Position Management: Long Put Spread → Put Butterfly
Action: Sell Out-of-the-Money (OOTM) Put Spread: Net Credit
Position Size: 25x → PS $25k x $20k @ ~0.04 BTC Credit
Max Profit: 5.1198 BTC
Min Profit: 0.166 BTC
Max Loss: N/A

Instrument	Amount	Avg Price	Mark Price	PNL (BTC)	Net Δ	Γ	Θ	v	Iv
27AUG21 (3)				0.6759	-2.20	0.000071	0.15	42.16	
BTC-27AUG21-30000P	25.00	0.0633	0.0627	-0.0162	-8.65	0.000824	-931.55	1,031.06	84.32%
BTC-27AUG21-25000P	-50.00	0.0400	0.0260	0.6985	8.03	-0.000965	1,301.13	-1,319.18	92.05%
BTC-27AUG21-20000P	25.00	0.0100	0.0097	-0.0064	-1.57	0.000213	-369.43	330.28	104.39%

Selling the Put Spread allows the portfolio to capture the change in Delta and Vega while creating a net credit position, and a risk-free trade, that offers a small negative delta (short protection), and neutral theta.

Adjustment: Put Spread into Ratio Spread
Action: Sell Short Strike in existing PS
Position Size: 25x → PS $25k @ .04 credit
Max Profit: 5.4.06 BTC
Min Profit: 0.04166 BTC
Max Loss: undefined
Break Even: Above $19,666 @ Expiration

Ratio Spread would be best suited for a change in directional thesis, changing from short delta to long, taking in a credit for any scenario where price ends up at the ~$20k strike or higher at expiration.

As the risk curve shows, creating a 1x2 ratio spread produces a significant change in the risk profile with unlimited downside risk, but at a very high probability of profit. The total credit increases and delta is relatively neutral at the money, with high downside gamma exposure should markets continue lower.

Additional Starting Low Vol Position:

Long Put + Long CS or Call Ratio:

Position: 100x Long Put + 100x Long Call + 50X Short Call (Ratio 2x1: back spread)
Net Debit: 15 ETH

Profit achieved in both long or short direction, but REQUIRES that delta moves occurs within trade duration (~45 days to expiration for August)

As shown the long put + long ratio call spread creates an interesting starting point from a low volatility environment, and allows the manager to take advantage of a change in delta, in either direction, as well as an increase in Vega and Gamma for any outsized directional price change.

Ratio Spreads

Ratio spreads are generally contrarian delta positions and generate small profitability with high probability.

Call Ratio is a 1x2 - long 1, short 2 - ideal strikes are long at 30 delta on calls and 25 deltas on Puts.

Selling the short strike at 2x the long should create a net credit.

Call Ratio =
bearish strategy - wins to the downside - max profit at short strike on upside

Put Ratio =
bullish strategy - wins to the upside - max profit at short strike on downside

Back Spread is the inverse of a Ratio Spread:

Long 2x, Short 1x - this is a long volatility position, creating an interesting starting point to manage rising volatility.

Managing Ratio Spreads

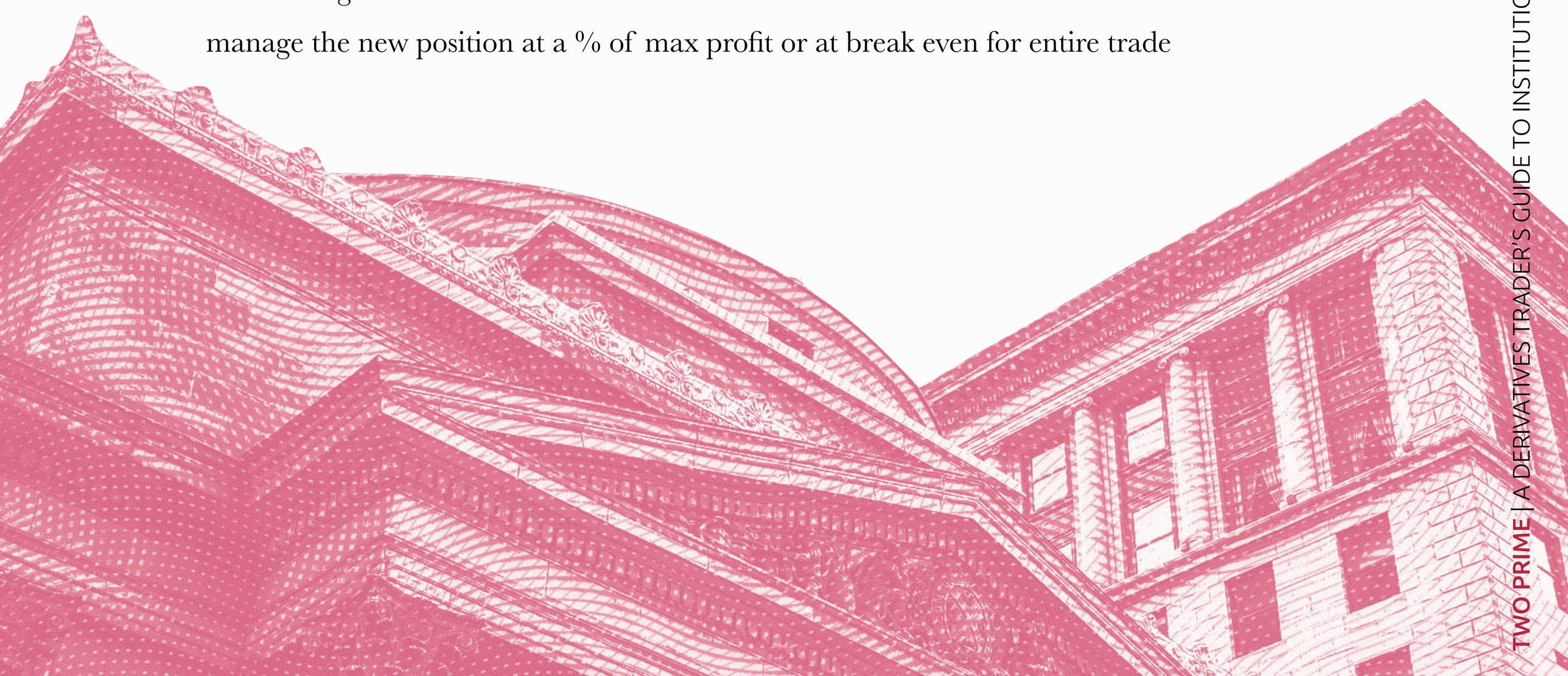
Favorable spot move in direction of spread → manage at a % of max profit

Defensive spot move against direction of spread →

Manage the winning 1x1 spread for profit

Roll the naked short strikes for duration at a credit, and sell the opposing C/P to create a short strangle and reduce delta

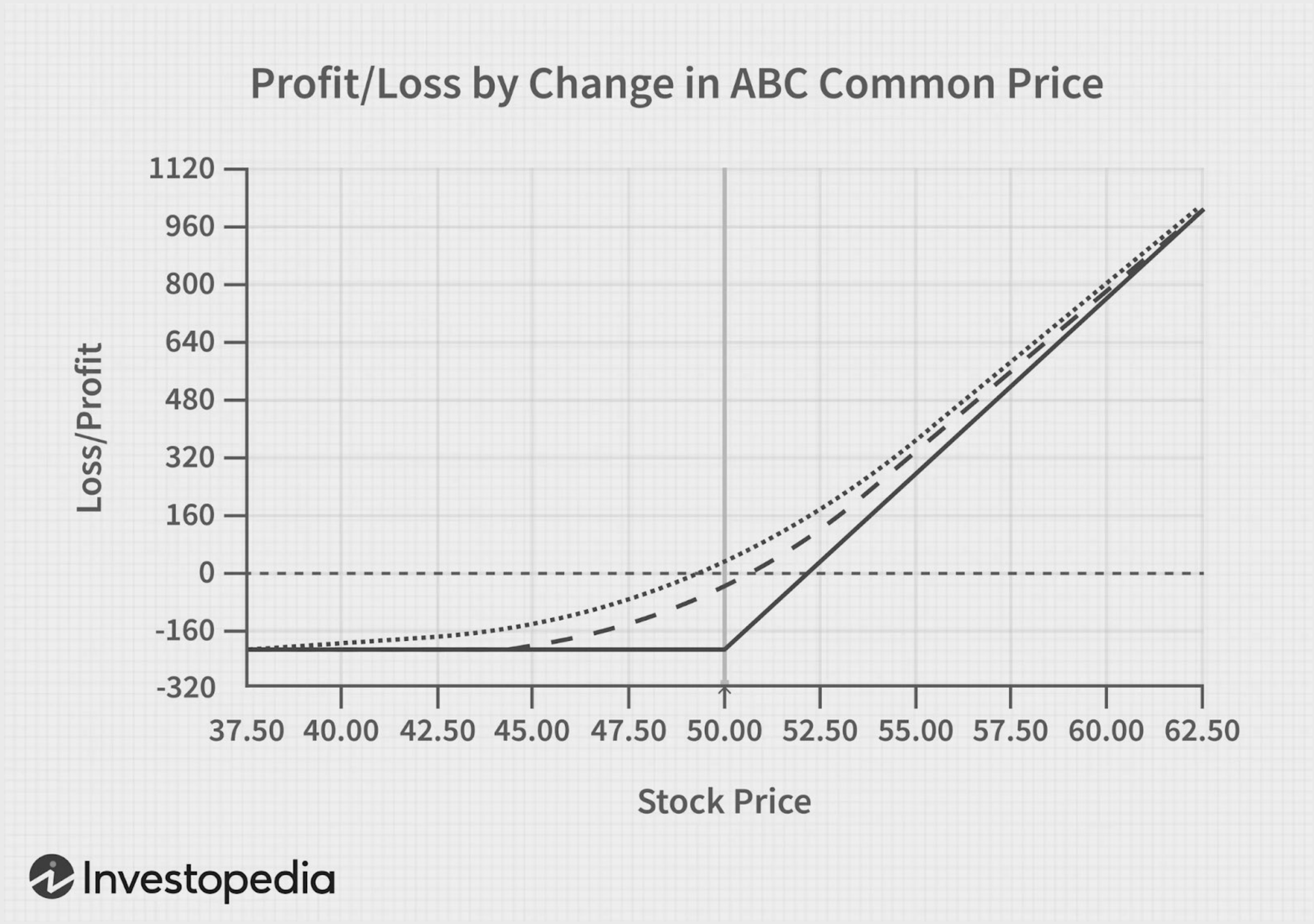
manage the new position at a % of max profit or at break even for entire trade



Traditional Futures and Basis Trading

Traditional Futures

A futures contract is an agreement to buy or sell a particular asset at a predetermined price at a specified time in the future. They are similar to traditional options in that they are an agreement to buy an asset at a predetermined price and time in the future, but differ in that buyers are obligated to purchase the underlying at the agreed-upon price while options have the right but not the obligation to buy the underlying asset. The implication of the buyer having the right but not the obligation means that the contract buyer does not have to purchase the asset at the strike price and therefore only suffers a loss equal to the premium paid to the options seller.



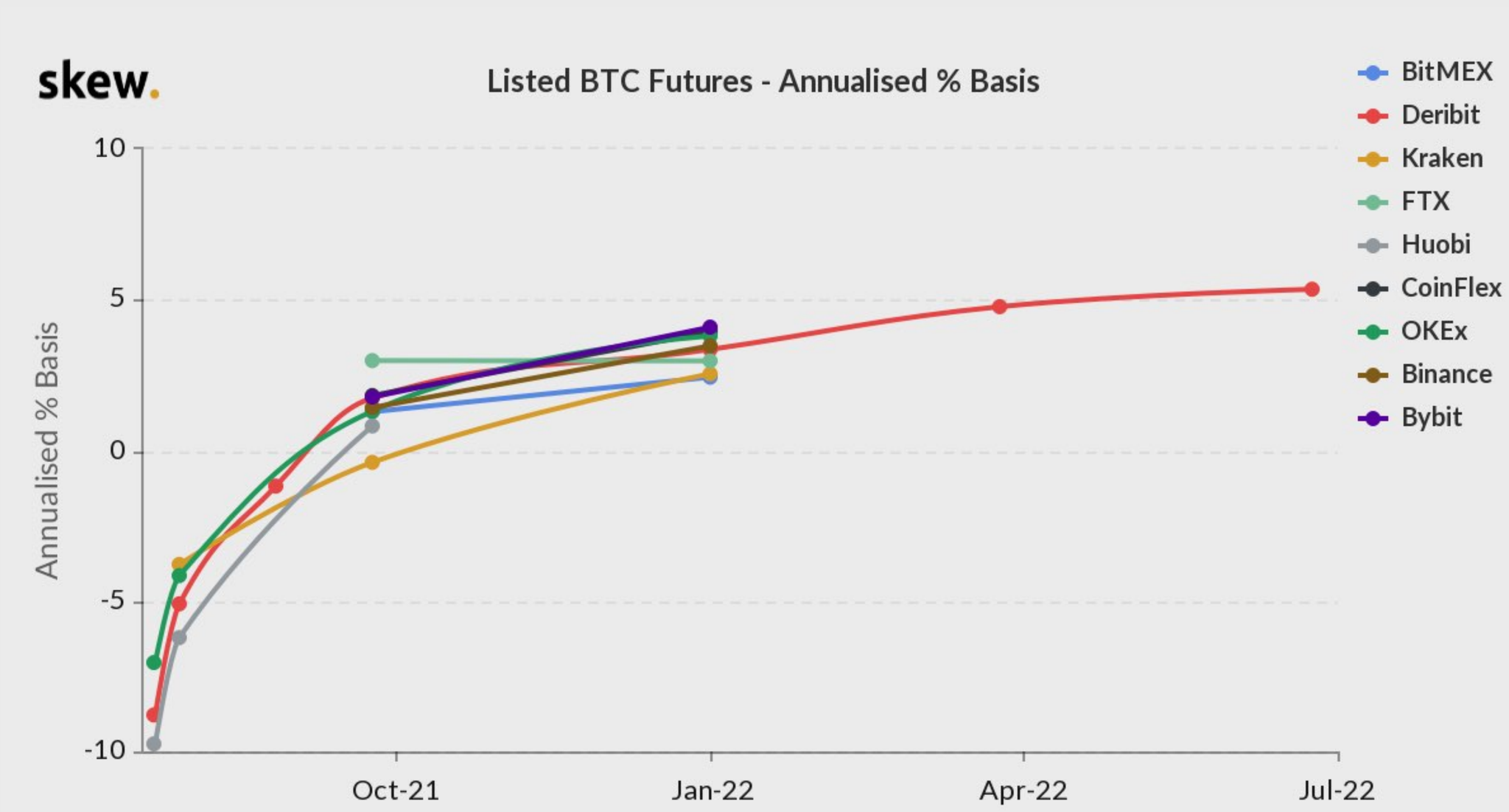
Unlike with digital assets options where only Deribit has a liquid options market, several exchanges offer liquid futures markets including Deribit, Binance, FTX, Bitmex, and Bitfinex. Reported derivatives exchange volumes by rank can be found on Coinmarketcap's website, though the accuracy of these numbers may not always prove accurate.

Basis Trading

Basis trading is the practice of trading the spread between an asset's spot price and future price at any expiration in the future. The trade is premised on the fact that spot and futures prices become identical when the future expires. Therefore, going long or short the futures contract while doing the opposite for spot results in a delta neutral trade that generates a fixed dollar return.

When a futures contract is trading above spot the contract is known as being in contango, and when the opposite is true it is called backwardation. When futures are in contango, to put on the basis trade, you would short the futures contract and go long spot thus making the spread between them. When the futures are in backwardation you would short spot and long futures to capture the spread. Once the trade is established you can then choose to roll part of the position into the future, trade it, or hold it until expiration. Historically, Bitcoin and Ether have traded in steep contango, with annualized yields of +20%. However, as of late, spreads have significantly decreased or even entered into backwardation.

To roll the position you would close part of the position expiring in X month and move it to the futures contract set to expire in a later month. This maintains a maximum possible yield at all times because some months will have a better return than others based on the steepness of the futures curve.



The chart on previous page shows the annualized[2] basis spread on multiple exchanges as of July 17th 2021. Futures are negative in the front month and several following months through September on an annualized basis and then become positive again around October expiration.[3]

There are two simple ways to capture the basis spread depending on prevailing market conditions. Shorting spot and buying front month[4] futures for an annualized yield of ~9% or shorting July 2022 futures and buying spot thus capturing the ~5% annualized basis yield until that contract expires one year from the present. To demonstrate rolling the contract, start by shorting July 2022 futures and longing spot. After the position is established, wait a few months for the September 2022 futures contracts to be listed on Deribit. At that point the September future is generating a yield of 5% while the July contract that you currently own is now only yielding a annualized return of 3%. In this scenario, one could roll forward the contract from July 2022 to September 2022 thus taking a 2% realized profit[5] on the basis spread and setting the position up for another unrealised profit of 5% due in one year. Indeed, if such opportunities were abundant you could make profits in a year significantly higher than holding the contract until expiration. If opportunities are not abundant (e.g. the futures basis spread increases) the position can be held until the position is trading in the money.

It is also possible to actively trade the compression and expansion of the futures contracts to maximize return. This would require price prediction and a toolset similar to those covered in other parts of this guide. Lastly, you can hold the futures contract until expiration without rolling them.

It is important to note that this is not a completely risk-free trade. Most digital assets exchanges do not allow cross margin between futures and spot markets. Thus, if the futures contract increases by more than 100% while shorting the contract the account could be liquidated.[6] Thus, choosing not to manage the position comes with additional risks when the underlying asset's price is in an uptrend.

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2. Annualized yields are yields standardized over a one year timeframe. In this context, it means that if you were to theoretically put on any of the above basis trades and hold them for a year your total yield over that period would be x%. However, this means that the real yield for certain contracts are relative to when they expire. For example, the July 2022 futures is almost exactly one year out therefore its real yield will be equal to its annualized yield. However, for the August 2021 futures those are only 2 months out and therefore your real yield is (annualized yield*2)/12 = real yield (2 representing a contract expiring in exactly two months and 12 representing the number of months in a year).

3. What this means is that the market is estimating that Bitcoin's price will be lower than it is now by the time the front month expires on July 30 but recover and be higher than it is now by the last Friday of September this year.

4. A term for the monthly futures expiring next.

5. For this to be true the spot side of the trade must be closed as well.

6. This assumes that no leverage is being used to short the futures contract. If leverage is being used, which it often is in trades like this, then you may receive a margin call long before the futures contract price doubles.

Perpetual Futures and DeFi Protocols

DeFi, or Decentralized Finance, is an emerging sub-industry utilizing blockchain technology to automate and remove counterparty exposure in financial markets. DeFi protocol examples include: over collateralized lending and borrowing protocols, decentralized exchanges (DEXs) utilizing automated market makers (AMMs) to create a fair and efficient price, and “oracles" or decentralized APIs which provide users with unbiased “off chain” data feeds such as price information. DeFi protocols allow third parties to provide liquidity in a trustless fashion, thus opening up many investment opportunities for interested investors. However, providing liquidity in return for fees on these platforms often comes with directional risk on top of protocol/technology error risk. To control this directional risk, liquidity providers often use perpetual futures to hedge out the asset’s volatility.

Perpetual Futures

Perpetual futures contracts (Perps or Perpetuals) are the most popular derivative products in the digital assets industry and most exchanges, outside of the US, offer liquid perpetual markets. Perpetuals have a similar risk profile to traditional futures but unlike traditional futures they have no expiration dates, hence “perpetuals,” and no settlement . With no expiration date the price should reflect underlying spot price at all times, so to encourage market participants to keep the price in line with spot the participants pay a regular fee to their counterparty when the perps price is greater or less than spot. When the perp price is greater than spot perp buyers must pay a fee to perp sellers until the perp is back in equilibrium; the inverse is true when perps trade below spot prices. Perp fees, known as funding rates, have two components: an interest rate and a premium component. The interest rate is usually relatively constant and set by the exchange based on the borrow and lending rates of the underlying asset. While the premium rate represents the fees paid to the counterparty for the perpetual trading above or below the spot index. The premium component will fluctuate from positive to negative depending on where the perp and spot are trading at but the interest rate will always be a debit to both counterparties in a trade.

The equations to calculate funding and funding rates are as follows:

Funding =
*Nominal Position Value * Funding Rate*

Funding Rate =
Premium + Interest Rate

Premium =
(Max(0, Impact Bid Price – Mark Price) – Max(0, Mark Price – Impact Ask Price)) / Spot Price + Fair Basis used in Mark Price

Decentralized Exchanges and Automated Market Makers

DEXs, or decentralized exchanges, do not operate as a traditional limit order book exchange like the Nasdaq or CME. Rather they use an AMM, or automated market maker, which pairs buyers or sellers with a pool of assets that third party investors deposit into the protocol. Asset prices on AMMs are determined by the ratio of two or more assets in a particular pool. If a buyer comes into the market and acquires one of the assets and pays for it with the other asset the price of the former will automatically increase against the latter as calculated by the algorithm. The AMM, therefore, eliminates the need for high frequency traders to make markets like in traditional markets. However, this does not mean high-frequency traders do not exist in the digital assets market, on the contrary, they are largely responsible for balancing out pools across AMMs during periods of high volatility.

For providing liquidity, investors are paid a fee on the total transaction value, usually around 0.05%, on stablecoin and pegged asset pairs, 0.3 on liquid unstable pairs, and 1% on exotic pairs with little liquidity. This fee is then paid out to liquidity providers pro rata based on how much liquidity they have provided to the pool.[7] In addition to these fees, liquidity providers also receive governance token incentives.[8] Governance tokens are tokens issued by a protocol that give the owner the ability to vote on protocol proposals and sometimes elections to the protocols foundation committee. Governance token holders also receive part of the protocol's revenue as "share buybacks," on a continuous basis.[9] Liquidity providers can also receive airdrops[10] by partnered protocols to incentivize complementary protocol growth. The combination of fees, token incentives, and airdrops makes providing liquidity to most protocols very lucrative despite the potential for an impermanent loss.

Impermanent loss and AMM Theory

Impermanent loss describes a dynamic on AMMs in which liquidity providers (LPs) lose part of their denominated token deposit in a pool when providing liquidity to an AMM. When LPs deposit tokens into a liquidity pool they must deposit an equal amount of each token, in dollar terms, into the pool. As the price of the tokens in the pool changes the value in dollars will also increase but not to the same extent as it otherwise would have if the LP was not providing liquidity. For example, let's say an LP deposits $1000 worth of $ETH and $1000 worth of USDT (a token that is pegged to the USD) into a pool when Ether's price is $2000; this means that they deposited 0.5 Ether and 1000 USDT into this pool. Let us now say that suddenly the price of Ether on Binance jumps to $2100. Arbitrageurs will now step in to bring the two prices into line by buying Ether on this DEX and selling it on Binance. Therefore, Ether is leaving the liquidity pool and USDT is entering the pool thus the LP will lose some of its deposited ETH and gain even more USDT to compensate the LP for the loss of Ether due to its price appreciation.

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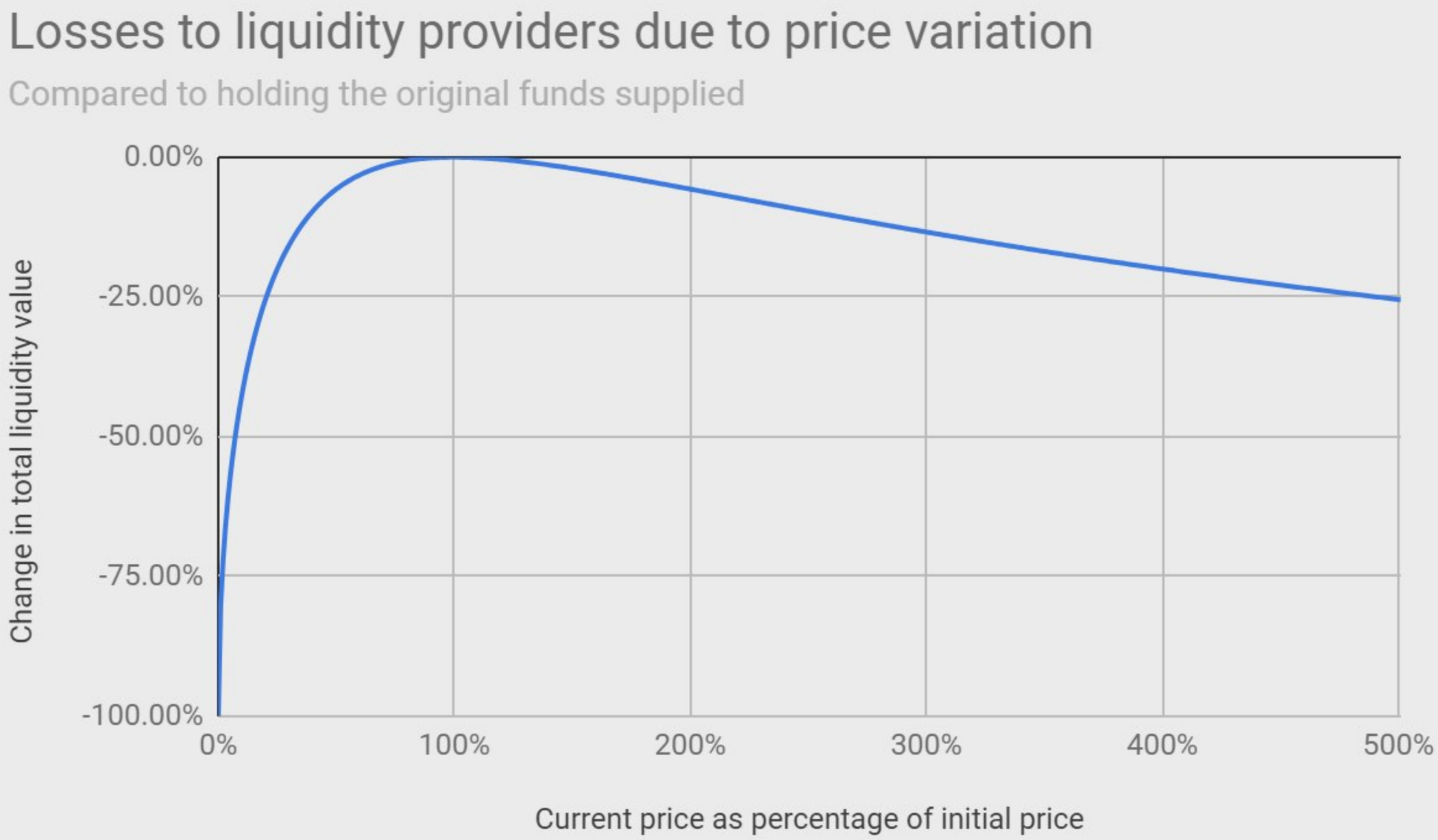
7. These fees usually do not auto-compound and have to be manually redeemed, the redemption total will be tracked by the protocol.
8. Governance token liquidity incentives are usually set prior to protocol launch as part of the pre-mine.
9. Essentially a small portion of a protocol's fees are collected and exchanged for governance tokens on the open market. These tokens are then deleted hence reducing the total supply of that token in circulation.
10. Tokens given away for free to network participants, usually in the interest of kickstarting a protocol's network.

The dollar value of the LPs deposit should therefore increase to $2050 to reflect the increase in value of your deposit approximately .488095 Ether and 1025 USDT. However, the deposit value will be slightly less than $2050 since the position will lose more Ether and receive less USDT than estimated. In this example, after the arbitrage is closed the LP would have .48795 Ether and 1024.7 USDT giving them a total deposit value of $2049.4. The difference between the unadjusted and adjusted totals reflects the profits picked up by the arbitrageur equalizing the prices.



The above graphic provided by Uniswap[11] demonstrates the impermanent loss curve as the price deviates from the price the trade was opened at. Regardless of direction, the position will lose value at an exponential rate compared to what you would have had if you had simply held an equal sized position in both assets. Many protocols have worked on solutions to reduce impermanent loss including: using low latency price oracles to rebalance prices between decentralized exchanges so as to circumvent arbitrageurs, letting liquidity providers create bands around a price[12] for which they are willing to provide liquidity for, and restricting liquidity pairs to stable coins[13] and highly correlated pegged assets.

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11. Uniswap is the largest AMM DEX in the Ethereum ecosystem
12. Uniswap V3 has implemented this mechanism.
13. digital assets which are designed to trade at par with a fiat currency, usually the US dollar.

Hedging DEX Liquidity Pools With Stable and Unstable Assets

Providing liquidity to an AMM is a yield generating strategy. It is a short volatility strategy as any price deviation will result in impermanent loss. To hedge against some directional risk liquidity providers often short perpetual futures contracts to reduce the compounding downside losses. As noted above, impermanent loss is bidirectional, but the value of a liquidity position still increases as the price of the underlying assets increases. However, as the asset's price decreases, liquidity providers will lose in dollar terms and lose tokens to impermanent loss. Shorting an amount of perpetual futures on the one unstable asset in your pool equal to the size of that token's position will cancel out the downside price risk of the position, thus making it delta neutral. Shorting perps can also cancel out part of the impermanent loss if perps position size is greater than that in the liquidity pool, although most liquidity providers are content to just hedge price risk since hedging comes with its own risk. Additionally, shorting perps usually provides a net credit to their holders since perps are usually trading above their spot price index, except for short periods during sharp price downturns. Thus, short perps usually pay for themselves, leaving the comparatively high APY generated by AMMs to their liquidity investors.

DEX Liquidity Pools With Two or More Unstable Assets

Liquidity providing for two or more unstable assets may initially appear more risky than providing liquidity for a stable/unstable coin pai,r but the probability of impermanent loss is lower for most asset pairs. This is because most digital assets are highly correlated with each other and therefore their cross prices are almost always more stable than that between a stable coin and either asset.

	BTC	ETH	ATOM	XMR	LINK	USDC
BTC	1					
ETH	0.64	1				
ATOM	0.57	0.63	1			
XMR	0.57	0.61	0.54	1		
LINK	0.61	0.83	0.68	0.59	1	
USDC	0.13	0.07	0.03	0.05	0.01	1

As the table above shows over a one year period the correlation between BTC and ETH was approximately .64, meaning that if Bitcoin were to move in one direction Ether will also move in that direction by a similar amount. Also notice how USDC, a USD stablecoin, has a relatively low correlation with Bitcoin and Ether thus indicating that the price of these assets are more volatile compared to USD than to each other.

	BTC	ETH	LINK
BTC	1		
ETH	0.64	1	
LINK	0.61	0.83	1

Hedging two or more unstable assets does not require hedging each asset using a perpetual future, although doing so would eliminate any uncertainty of future correlations deviating from past correlations. Rather it is sufficient to hedge the most liquid of the assets in the pool but in size large enough to cover losses across all deposit assets in a pool. For example, let us say an LP deposits $1000 each of $ETH, $WBTC, and $LINK into a pool; these assets (as pictured above) have correlations of .64 WBTC/ETH, .61 WBTC/LINK, and .83 ETH/LINK. Therefore, LP can hedge the coin with the highest net correlation between the other two assets in size equal to the deposit size of $3000 and protect against most directional risk. The coin with the highest net correlation is ETH since its correlations with BTC and LINK are, respectively, 0.64 and 0.83 thus protecting against 64% and 83% of the other assets' price risk.

DEX Liquidity Pools With Two or More Pegged Stable Assets

Stablecoin pools have no price risk, in USD terms, and almost no risk of impermanent loss potential because they are all pegged to the same asset, the dollar. The only risks for providing stablecoin liquidity are protocol and depegging risk. Protocol risk is the risk that the DeFi protocol being used will suffer a failure due to a code error or an error within the protocol's internal logic. While depegging risk is the risk that the underlying stablecoin asset will lose its peg to USD and more than likely go to zero. In the event of providing liquidity with three stablecoins, USDC, USDT, and DAI, each deposit being $1000, upon one of the above losing all of its value the position would lose 100%, or $3000.

Thus, unless you are providing liquidity for an experimental new stable coin on a new, and potentially flawed protocol, there is very little risk to providing liquidity in these pools. A fact which is reflected in the yield generated from stablecoin pairs. For example, as of the publishing of this report the APY on the Curve protocol DAI, USDC, USDT “3pool” is 2.11% base and 5.65% after Curve reward tokens are taken into account. A far lower yield than one finds in non-stablecoins.

DEX Liquidity Pools With Two or More Pegged, Unstable Assets

The fourth type of liquidity pools are the pegged, unstable asset pools. These pools comprise several assets that are pegged to each other but the underlying asset is not a fiat currency. Examples of this type include WBTC and RenBTC, both which are Ethereum-based tokens that are pegged to Bitcoin. Pegged assets are necessary to transfer value on a blockchain where the base coin is not natively available. Bitcoin, for instance, cannot natively interact with the Ethereum virtual machine because it is not built on the same code base as Ethereum and has no mechanism built into its code to allow it to communicate with other non-compatible blockchains. Therefore, it is necessary to copy, or "wrap[14]," Bitcoin with an Ethereum smart contract, thus allowing it to interact with Ethereum-based protocols.

Unstable pegged assets have the same price risk as an non-stablecoin pool but with the impermanent risk profile of a pegged stablecoin asset pool. Naturally, the price risk for wrapped BTC pairs remains since both assets deposited into the pool will lose value as the value of the underlying asset decreases in USD terms. However, unless the two assets unpegged from each other and stayed unpegged, the position would suffer almost no impermanent loss since the cross price between the two assets would stay constant. Therefore, the optimal strategy for a liquidity provision of this type is to hedge the underlying asset in equal proportions to the size of the liquidity deposit by going short the perpetual futures.

14. There are multiple methods of "wrapping" another coin. Wrapped BTC, $WBTC, is a centrally custodied solution whereas for RenBTC the Bitcoin is locked in a decentralized vault on the Ren blockchain.

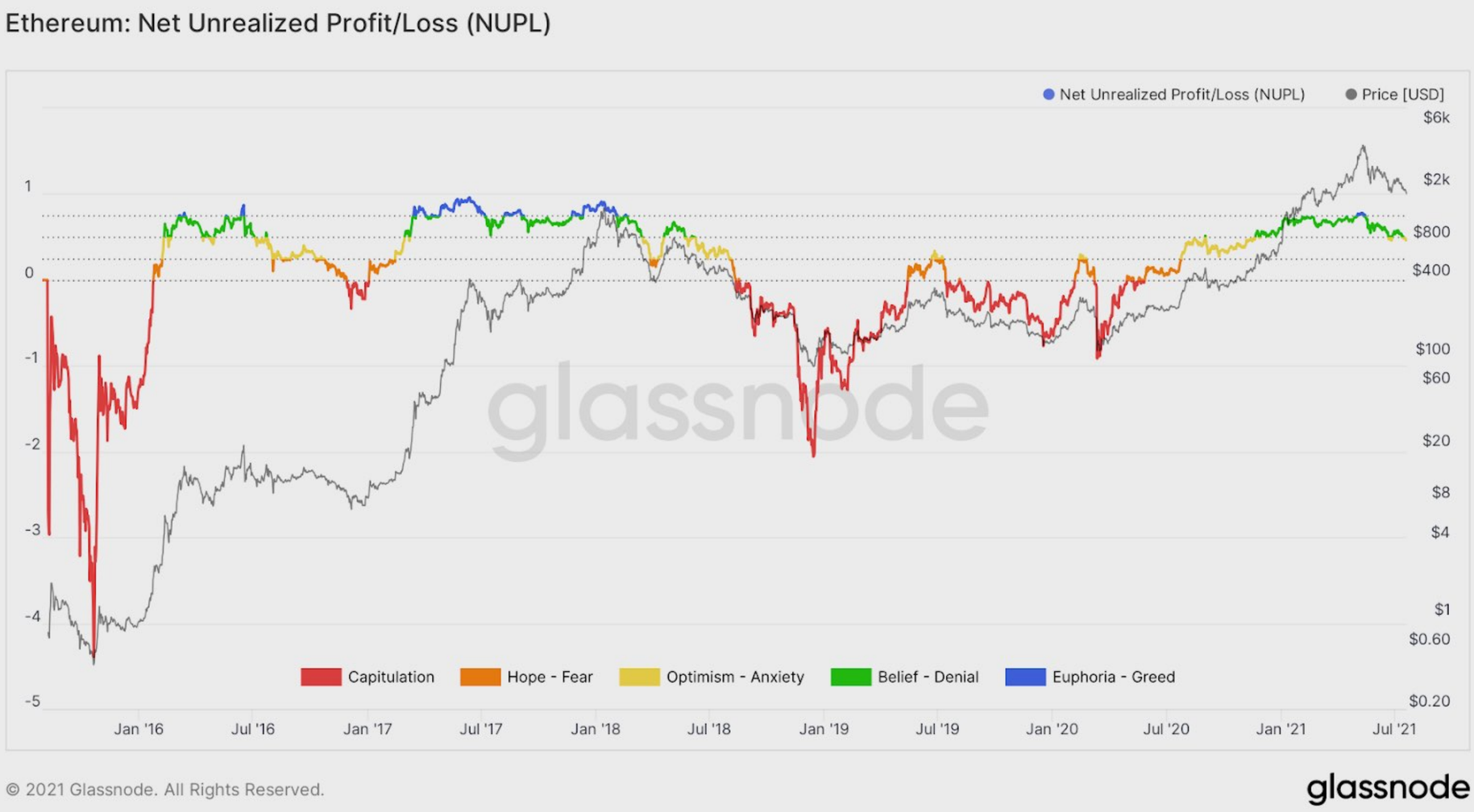
ON-CHAIN DATA ANALYSIS

With the innovation of blockchain technology comes data pulled directly from a blockchain's public transaction history, or on-chain data. On-chain data is still a developing data analytics subfield and therefore not as proven as derivatives data analytics. However, there is still room to use on-chain metrics to complement traditional derivatives strategies.

On-Chain Metrics

Net Unrealized Profit/Loss

Net Unrealized Profit/Loss, or the difference between Relative Unrealized Profit and Relative Unrealized Loss for all coins on the blockchain, gives us insight into how many coin holders are in profit and how many have suffered losses. If the vast majority of coins are in profit, especially over shorter timeframes, this may indicate that the probability of a sell-off is higher as there are far more short-term traders holding the coin as compared to when most holders have suffered losses. Conversely, when there are relatively few profitable coin holders most of the remaining coin holders are likely to be investors with a long-term outlook and continue to support the price at a particular level.



MVRV & MVRV Z-Score

The MVRV Z-Score assesses when Bitcoin is over/undervalued relative to its "fair value" as measured by MVRV. When market value is significantly higher than realized value, it has historically indicated a market top, while the opposite has indicated market bottoms. In trading you can use this metric to help you determine if options skew should be different than it actually is and therefore play the counter trade.

Bitcoin: MVRV Z-Score

glassnode

TECHNICAL ANALYSIS

The variety of technical indicators used by traders to analyze price action is virtually endless. Anyone familiar with technical analysis has undoubtedly experienced the phenomenon of "analysis paralysis," an overload of information that prevents one from acting.

That said, some of the most common technical indicators include: moving averages (50 days, 100d, 200d), Bollinger Bands (standard deviation measurements), RSI (relative strength index), MACD (moving average convergence divergence).

Moving averages

A moving average is a widely used technical indicator that smooths out price over time by creating an average of the historical price over a defined period of time. Typical increments include the 50 days, 100 days, and 200 days (to name a few), but traders ascribe to all varieties of durations to try and capture insight into price action.

Price movement away from, toward, or through a moving average can all have significance to traders, and provide bullish and bearish interpretations of what to expect based on previous activity. Often moving averages signal levels for support & resistance and crossing them can indicate a change in trend.

Volume

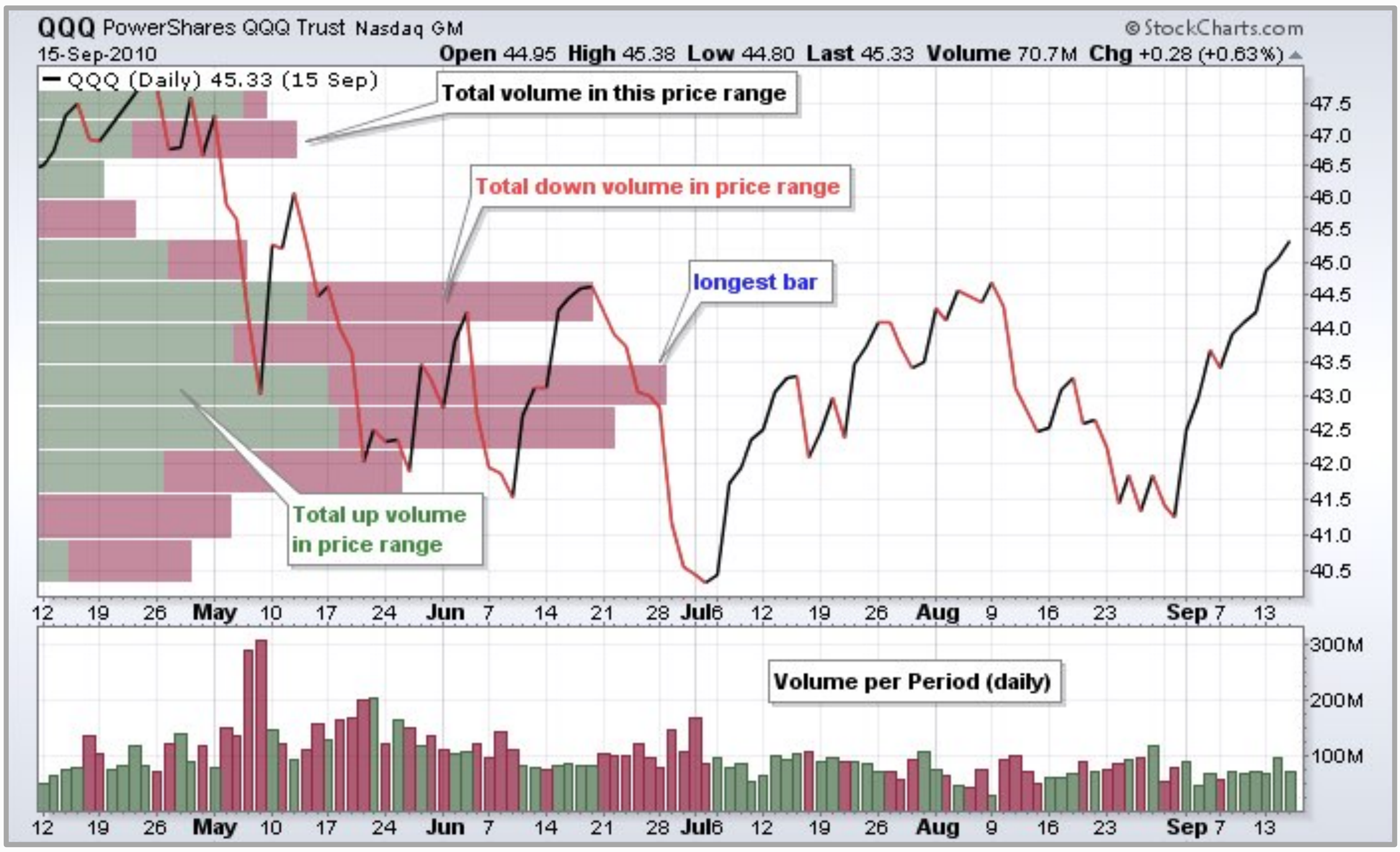
Volume is the amount of tradable assets that exchanged hands within a certain period of time. High volume corresponding with a move up or down is indicative of a continuation of that move. Low volume on big moves is indicative of weakness and often leads to mean reversion.

Support & Resistance

Support and resistance are price levels where the asset price is more likely to pause its directional move up or down. Traders also consider these critical levels where a continuation move through the level will likely be met with significant momentum and volume.

Volume at Price

Volume at a specific price point is often indicative that many buyers and sellers find a certain price acceptable to trade. High volume around a specific price reveals that a lot of bulls and bears consider that price important. Often these price points correspond to support and resistance levels where bulls and bears long and short the market, respectively, in anticipation of a sharp move in either direction from that price.



Bollinger Bands

Bollinger Bands are envelopes plotted at a standard deviation level above and below a simple moving average of the price. Because the distance of the bands is based on standard deviation, they adjust to volatility swings in the underlying price.

Source: www.fidelity.com

Bollinger Bands use 2 parameters, Period and Standard Deviations, StdDev. The default values are 20 for the period, and 2 for standard deviations, although you may customize the combinations.

PUTTING THE PIECES TOGETHER - COMBINING DERIVATIVE, ON-CHAIN, AND TECHNICAL ANALYSIS

While no single metric or data series can provide a full-proof, alpha generating signal 100% of the time, combining data analysis across derivatives, on-chain, and technical analysis can significantly improve both the probability of outperformance, and mitigate risk.

At Two Prime, we have categorized these data inputs as follows:

On-Chain - Macro Environment

On-chain analysis is used primarily as a macro environment identifier, and provides a snapshot of underlying market structure, profitability of investors, duration of holding, and flow of assets between miners, exchanges, and investors.

When on-chain metrics reach statistical highs and lows, they serve as red flags that the current environment may be reaching a critical level or inflection point. While on-chain analytics are typically too macro to make smaller time frame decisions, they can serve as a critical overlay to inform longer term market outlook and risk management protocols.

Technical - Trade Signals

Technical analysis serves as the decision-making overlay to express directional bias and a trading view. Combining metrics and applying data analysis to identify statistically significant overbought and oversold areas, support and resistance zones, provides opportunities for alpha generation and risk-management.

Derivatives - Portfolio Construct

Combined with on-chain and technical analysis, derivative analysis allows us to build the best risk/reward scenarios in a derivative portfolio by maximizing returns and probability of profit based on volatility and mean reversion. While directional bias may be determined by on-chain and technical signals, HOW to construct the portfolio to best capture a move, or protect against volatility is where derivative markets are especially useful.

In the event a short position makes sense, looking at derivative markets informs traders about the volatility environment, and how to optimize a portfolio to increase profitability and reduce the total cost of a derivative position. Together, these tools are essential to investors and fund managers who wish to navigate turbulent digital assets markets, reduce total portfolio volatility, and generate alpha.

TWO PRIME

A DERIVATIVES TRADER'S GUIDE TO INSTITUTIONAL CRYPTO AND DEFI

JULY, 26TH **2021**